Scientific Journal of
Rehabilitation Medicine

November and December 2022. Volume 11. Num 5

Research Paper

Scapulohumeral Rhythm, Kyphosis, and Forward Shoulder in Iranian Wushu Athletes and Non-athletes

*Hamed Babagoltabar Samakoush[1], Aliasghar Norasteh[2]

1. Department of Sport Injury and Corrective Exercise, Faculty of Physical Education and Sport Sciences, University of Guilan, Rasht, Iran.
2. Department of Physiotherapy, Faculty of Physical Education and Sport Sciences, University of Guilan, Rasht, Iran.

Use your device to scan and read the article online

Citation Babagoltabar Samakoush H & Norasteh A. [Evaluation of Scapular Humeral Rhythm, Kyphosis and Forward Shoulder in National Level Wushu Practitioners and Non-Athletes (Persian)]. Scientific Journal of Rehabilitation Medicine. 2022; 11(5):836-849. https://dx.doi.org/10.32598/SJRM.11.5.3

https://dx.doi.org/10.32598/SJRM.11.5.3

ABSTRACT

Background and Aims Daily living activities require the composition and coordination of scapulothoracic and glenohumeral joints. In athletes, the position of the scapula have a direct effect on their athletic performance due to its relationship with shoulder function. This study aims to investigates the scapulohumeral rhythm, kyphosis and forward shoulder in Iranian Wushu athletes and non-athletes.

Methods This is a quasi-experimental study. Participants were 27 wushu athletes (Age: 23.29±1.72 years, height: 1.72±0.20 m, weight: 69.50±11.50 kg, body mass index: 22.25±3.29 kg/m^2) and 27 non-athletes (Age: 25.92±2.85 years, height: 1.75±0.07 m, weight: 69.36±11.73 kg, body mass index: 22.53±3.08 kg/m^2) which were selected using a convenience sampling method. The kyphosis angle was assessed with a flexible ruler and the forward shoulder was assessed using the photographic method. The distance of the scapula from the spine was assessed using the lateral scapular slide test. Independent t-test was used to examine the differences between the groups, and Pearson correlation test was used to examine the relationship between the study variables. Statistical analysis was performed in SPSS software, version 24. The significance level was set at 0.05.

Results The angles of kyphosis and forward shoulder had a significant relationship with the distance of the scapula from the spine at 0, 45 and 90 degrees of arm abduction (P≥0.05) such that with increasing kyphosis and forward shoulder angles, the distance increased. In non-athletes, there was a significant difference between the distances of dominant and non-dominant scapula from the spine in 0 degree (P=0.01) and 45 degrees (P=0.02) of arm abduction; in 90 degrees, no significant difference in non-athletes was observed. Results of independent t-test showed a significant difference in kyphosis and forward shoulder angles and in the distance of the scapula from the spine at different degrees of arm abduction between the two groups (P≤0.05), which were greater in athletes than in non-athletes.

Conclusion The kyphosis and forward shoulder angles have a relationship with the position of the scapula on the spine in professional Wushu athletes. More attention should be paid to these changes and their evaluation in terms of injury and musculoskeletal disorders.

Keywords Non-athletes, Wushu, Forward shoulder, Kyphosis, Scapulohumeral rhythm

Received: 22 Jan 2021
Accepted: 18 Feb 2021
Available Online: 22 Nov 2022

* *Corresponding Author:*
Hamed Babagoltabar Samakoush
Address: Department of Sport Injury and Corrective Exercise, Faculty of Physical Education and Sport Sciences, University of Guilan, Rasht, Iran.
Tel: +98 (911) 5871408
E-Mail: hb.sama@yahoo.com

Extended Abstract

Introduction

One of the characteristics of athletes is their posture, which distinguishes them from others [1]. To achieve progress, athletes should have long-term training [2]. Therefore, they are prone to some types of postural deformity depending on the type of sports activity [2, 3], which may lead to a wide range of disorders [4]. Since the scapula bones are connected to the spine by muscles and ribs, it can be expected that any change in the position of the spine and shoulder girdle can lead to a change in the position of the shoulder [5, 6]. In this regard, various studies people with shoulder impingement or healthy people, including overhead athletes have emphasized the asymmetry of the shoulders [7-9].

The trunk and upper limbs are involved in performing most of the Wushu techniques. Given that repeated punches at different angles in a bent position may cause changes in the position of the shoulder, considering the key role of the spine, the shoulder complex, and scapula bone in Wushu sport, and since the body position adopted in Wushu sport can affect the physical condition of the athletes, and there is no research to examine the position of the scapula bone and its lateral movement among Wushu athletes, this study aims to investigate the position of scapular bones and their lateral movement in professional Wushu athletes in Iran compared to non-athletes.

Table 1. Means of forward shoulder angle, kyphosis angle, interscapular distance, and lateral movement of the dominant and non-dominant scapula in two study groups

Variables	Group	Mean±SD	Mean Difference	T	P
Forward shoulder angle (degree)	Athletes	50.59±1.42	-4.18	-10.07	0.001**
	Non-athletes	54.77±1.62			
Kyphosis angle (degree)	Athletes	40.00±1.38	-10.07	-15.40	0.001**
	Non-athletes	50.02±3.08			
Interscapular distance (cm)	Athletes	15.27±1.44	-1.96	-3.43	0.001**
	Non-athletes	17.23±2.57			
Distance of the dominant scapula from the spinous process at a 0-degree angle (cm)	Athletes	7.76±0.81	-0.80	-2.59	0.001**
	Non-athletes	8.57±1.38			
Distance of the non-dominant scapula from the spinous process at a 0-degree angle (cm)	Athletes	7.47±0.71	-1.18	-4.13	0.001**
	Non-athletes	8.65±1.26			
Distance of the dominant scapula from the spinous process at a 45-degree angle (cm)	Athletes	9.14±1.06	-0.79	-2.53	0.01*
	Non-athletes	9.93±0.92			
Distance of the non-dominant scapula from the spinous process at a 45-degree angle (cm)	Athletes	8.75±0.98	-1.24	-3.85	0.001**
	Non-athletes	9.99±1.34			
Distance of the dominant scapula from the spinous process at a 90-degree angle (cm)	Athletes	9.93±0.93	-0.76	-2.49	0.001**
	Non-athletes	10.69±1.29			
Distance of the non-dominant scapula from the spinous process at a 90-degree angle (cm)	Athletes	10.02±1.13	-0.84	-2.56	0.001**
	Non-athletes	10.86±1.27			

**Significant at P<0.001.

Materials and Methods

This is a quasi-experimental study. The statistical population consists of professional Wushu athletes and non-athletes in Iran. Using a convenience sampling method, 27 wushu athletes and 27 healthy non-athletes were selected. Athlete had at least 6 years of experience and a medal a national or international competitions with no any specific injuries in the upper or lower limbs. Non-athletes were not active in any sports. The measurements were done in one month. Before conducting the study, necessary explanations about the tests were given to the subjects, and they all declared their consent to participate in the study. Before the measurements, none of the subjects performed heavy exercise.

A tape measure was used to assess the body height, and a digital scale was used to measure the body weight. The body mass index was calculated using the formula of weight (kg) divided by the height squared (m). To evaluate the kyphosis angle, a flexible ruler was used, and the forward shoulder was determined by the photographic method. Furthermore, the scapulohumeral rhythm was determined with the lateral scapular slide test. The comparisons of forward shoulder angle, kyphosis angle, lateral movements of the shoulders, and lateral movements of the right and left scapula were done by the independent t-test. Also, Pearson's correlation test was used to investigate the relationship between kyphosis angle and shoulder forward with scapulohumeral rhythm.

Results

The results related to the forward shoulder angle, kyphosis angle, interscapular distance, and lateral movements of the dominant and non-dominant scapula for the two study groups in different angles of arm abduction using independent t-test are presented in Table 1.

According to the results of independent t-test in Table 1, there was a significant difference in the scapulohumeral rhythm in the dominant and non-dominant shoulders, kyphosis angle, and forward shoulder angle in two groups where the angles of forward shoulder and kyphosis were higher in the athletes than in non-athletes. Moreover, the distance between the scapulae and the spinous processes was greater in the athletes than in non-athletes.

Discussion

There is a significant difference in the forward shoulder angle, kyphosis angle, and scapulohumeral rhythm between Wushu athletes and non-athletes, indicating the presence of musculoskeletal disorders in Wushu athletes. There is a significant relationship between the increase in the forward shoulder and kyphosis angles and the scapulohumeral rhythm. Moreover, in non-athletes, there is a significant difference in the distance of the two dominant and non-dominant scapulae with the spinous processes in the arm abduction angles of 0 and 45 degrees.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Authors' contributions

All authors contributed equally in preparing all parts of the research.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgments

All Wushu athletes and non-athlete students who helped the researchers in this research are thanked and appreciated.